

H-CYCLES AND *H*-PATHS IN *H*-EDGE COLOURED DIGRAPHS.

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Let H be a strongly transitive digraph (possibly with loops) and D a digraph (that contains neither loops nor multiple arcs). A digraph D is said to be H -colored if the arcs of D are colored with the vertices of H . We will denote by $c(x, y)$ the color of the arc $(x, y) \in F(D)$. An H -walk (path) is a directed walk (directed path) $C = (z_0, z_1, \dots, z_t)$ in D such that $(c(z_0, z_1), c(z_1, z_2), \dots, c(z_{t-1}, z_t))$ is a directed walk in H .

A set N of $V(D)$ is said to be an H -kernel by paths (walks) in D if it satisfies the following two conditions: 1) for every two different vertices u, v in N does not exist an H -path (walk) between them and; 2) for every vertex x in $V(D) - N$ exists a vertex y in N such that there is an H -path in D from x to y .

Let H be a strongly transitive digraph and D a digraph H -colored. Let D_1 and D_2 be spanning subdigraphs of D . We will say that $P = \{D_1, D_2\}$ is an H -separation of D if:

1. $F(D_1) \cap F(D_2) = \emptyset, F(D_1) \cup F(D_2) = F(D)$
2. Every H -path of D is contained in D_1 or it is contained in D_2 .

In this talk we have proved that if H is a strongly transitive digraph and D is a digraph H -colored, $P = \{D_1, D_2\}$ an H -separation of D such that:

1. Every cycle of D that is contained in D_i is an H -cycle for $i = 1, 2$.
2. D does not contain a (D_1, D, D_2) H -subdivision of C_3
3. If (u, z, w, x_0) is a (D_1, D, D_2) H -subdivision of P_3 then there exist some of the following H -paths: an H -path from u to x_0 or an H -path from x_0 to u .

Then D has a H -kernel by paths.

Keywords: H -kernel, H -colored digraph, H -kernel by paths.

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References

- [1] H. Galeana-Sánchez, G. Gaytán-Gómez, R. Rojas-Monroy, Monochromatic cycles and Monochromatic paths in arc-colored digraphs, *Discusiones Math.*, in print.
- [2] H. Galeana-Sánchez, R. Sánchez-López, H-kernels in the D -join, *Ars Combinatoria*, 98 (2011) 353-377.